

Service Manual

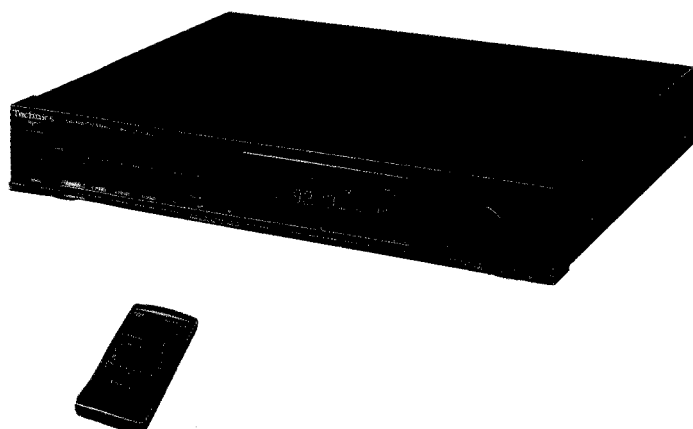
Tuner

LW/MW/FM STEREO TUNER

ST-X301L

Color

(K) Black Type



SPECIFICATIONS

(DIN 45 500)

FM TUNER SECTION

Frequency range	87.50 ~ 108.00 MHz (0.05 MHz steps)
Sensitivity	1.5 μ V (IHF, usable)
S/N 30 dB	1.3 μ V (75 Ω)
S/N 26 dB	1.2 μ V (75 Ω)
S/N 20 dB	0.9 μ V (75 Ω)
IHF 46 dB stereo quieting sensitivity	28 μ V/75 Ω
Total harmonic distortion	
MONO	0.15 %
STEREO	0.3 %
S/N	
MONO	70 dB (78 dB, IHF)
STEREO	65 dB (70 dB, IHF)
Frequency response	20 Hz ~ 15 kHz, +0.5 dB ~ -1.5 dB
Alternate channel selectivity	
$\pm$ 400 kHz	55 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	45 dB
IF rejection at 98 MHz	90 dB
Spurious response rejection at 98 MHz	75 dB
AM suppression	55 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	-30 dB (-35 dB, IHF)
38 kHz	-45 dB (-50 dB, IHF)
Channel balance (250 Hz ~ 6,300 Hz)	$\pm$ 1.5 dB
Limiting point	1.2 μ V
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	75 Ω (unbalanced)

AM TUNER SECTION

Frequency range	
MW	522 kHz ~ 1611 kHz (9-kHz steps)
LW	530 kHz ~ 1620 kHz (10-kHz steps)
LW	155 kHz ~ 353 kHz (9-kHz steps)
LW	153 kHz ~ 351 kHz (-2-kHz shift)
Sensitivity (S/N 20 dB)	
MW	20 μ V, 300 μ V/m
LW	50 μ V

Area

Country Code	Area	Color
(E)	Continental Europe	(K)
(EB)	Great Britain	
(GC)	Asia, Latin America, Middle Near East and Africa	
(GN)	Oceania	

Selectivity ($\pm$ 9 kHz)

MW (at 999 kHz)	50 dB
LW (at 254 kHz)	50 dB
Image rejection	
MW (at 999 kHz)	40 dB
LW (at 254 kHz)	40 dB
IF rejection	
MW (at 999 kHz)	60 dB
LW (at 254 kHz)	60 dB

TIMER SECTION

Clock	Quartz-lock type
Functions	24-hour indication
	24-hour programmable;
	weekly (1 setting)
	once only (1 setting)
	sleep (at 10 ~ 60 min., 10-min. intervals)
Programmable content	
	Program source (FM, MW, LW, CD, TAPE)
	Timer rec/timer play/power ON/OFF setting
	Designation of preset station
Setting intervals	1 minute ~ 23-hours, 59 minutes
	(at 1-min. intervals)
Priority order	sleep, once, weekly

GENERAL

Output voltage	0.3 V (0.6 V IHF)
Power consumption	9 W (Standby 5 W)
Power supply	
For Continental Europe	AC 50 Hz/60 Hz, 220 V
For Great Britain and Oceania	AC 50 Hz/60 Hz, 240 V
For others	AC 50 Hz/60 Hz, 110 V/120 V/200 V/240 V
Dimensions (W $\times$ H $\times$ D)	360 $\times$ 64.5 $\times$ 288 mm
	(14-3/16" $\times$ 2-17/32" $\times$ 11-11/32")
Weight	2.1 g (4.6 lb.)

Note:

Specifications are subject to change without notice. Weight and dimensions are approximate.

Technics

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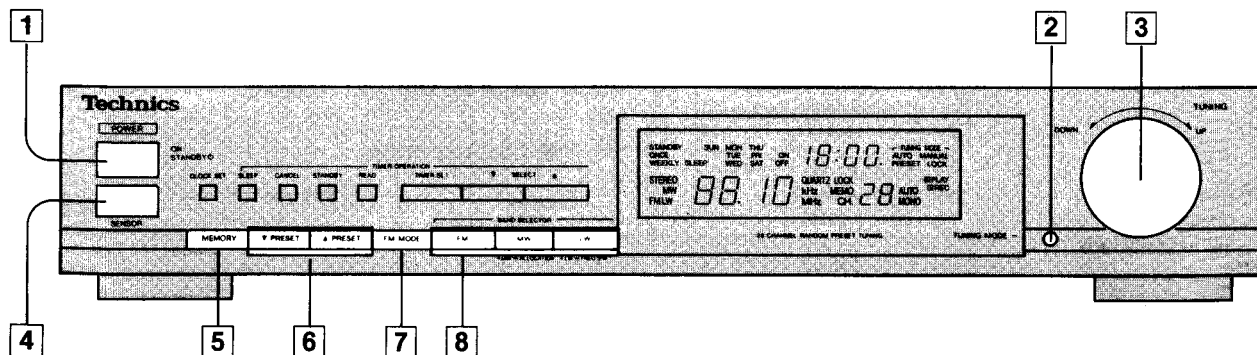
■ ACCESSORIES

	Page
•Stereo connection cable (SJKP2203-2)	1
•FM indoor antenna	1
For (GC) (GN) areas only (SSA272M)	
For (E) (EB) areas (SSA270M)	
•AM loop antenna (SPB1162T)	1
•AM antenna holders (SMA233-1M)	1
(SMA231M)	1
•Screws (XTB3+10AFZ)	2
•3-core flat cable (SWKTX930E)	1

•AC plug adaptor (RJP9215) for (GC) area only	1
•AC power supply cord	1
For (GN) area only (SJA173)	
For (GC) area only (RJA0004)	
For (E) only (SFDAC05E03)	
For (EB) area only (SJA193)	
•Remote-control transmitter (RAK-SC301X)	1
•Attachment plug (SJP9009) for (EB) area only	1
•Batteries (R03)	2

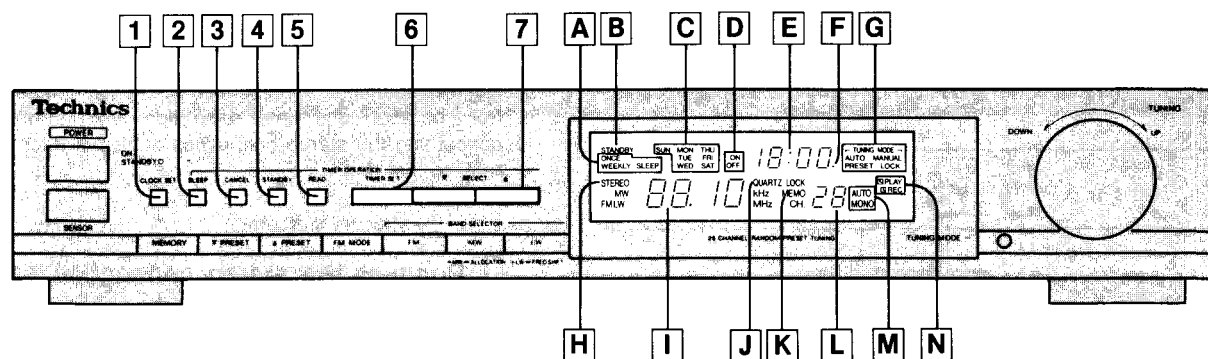
■ LOCATION OF CONTROLS

The indication AM used here includes both MW and LW.



Tuner section

- | | |
|--|---|
| <p>1 Power "STANDBY ϕ /ON" switch
(POWER/ON/STANDBY ϕ)</p> <p>2 Tuning-mode selector (TUNING MODE)</p> <p>3 Tuning control (TUNING)</p> <p>4 Remote-control signal receptor (SENSOR)</p> | <p>5 Memory button (MEMORY)</p> <p>6 Preset-channel buttons
($\blacktriangledown$ PRESET/$\blacktriangle$ PRESET)</p> <p>7 FM mode selector (FM MODE)</p> <p>8 Band selectors (BAND SELECTOR)</p> |
|--|---|



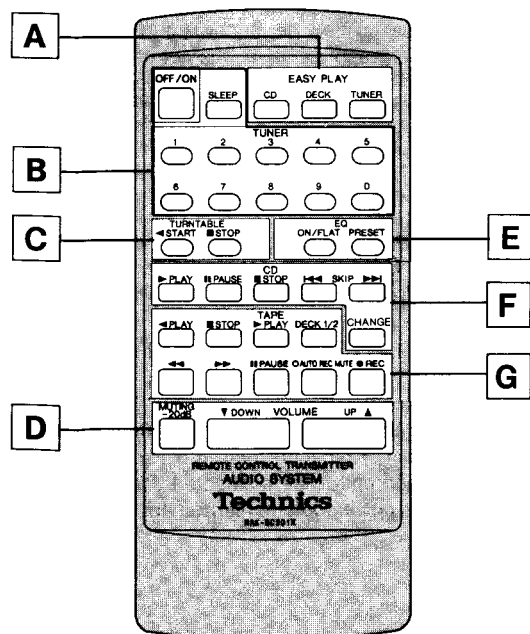
Timer section

- 1 Clock set button (CLOCK SET)
- 2 Sleep button (SLEEP)
- 3 Cancel button (CANCEL)
- 4 Stand-by button (STANDBY)
- 5 Read button (READ)
- 6 Set button (TIMER SET)
- 7 Select buttons (SELECT)

Display section

- A Timer-mode indicator (ONCE/WEEKLY/SLEEP)
- B Stand-by indicator (STANDBY)
- C Day display
- D Timer ON/OFF indicator (ON/OFF)
- E Time display
- F Colon indicator
- G Tuning-mode indicator (AUTO/MANUAL/PRESET/LOCK)
- H FM stereo indicator (STEREO)
- I Digital frequency display
- J Quartz-lock indicator (QUARTZ LOCK)
- K Memory indicator (MEMO)
- L Channel display
- M FM mode indicator (AUTO/MONO)
- N Timer play/rec indicator (PLAY/REC)

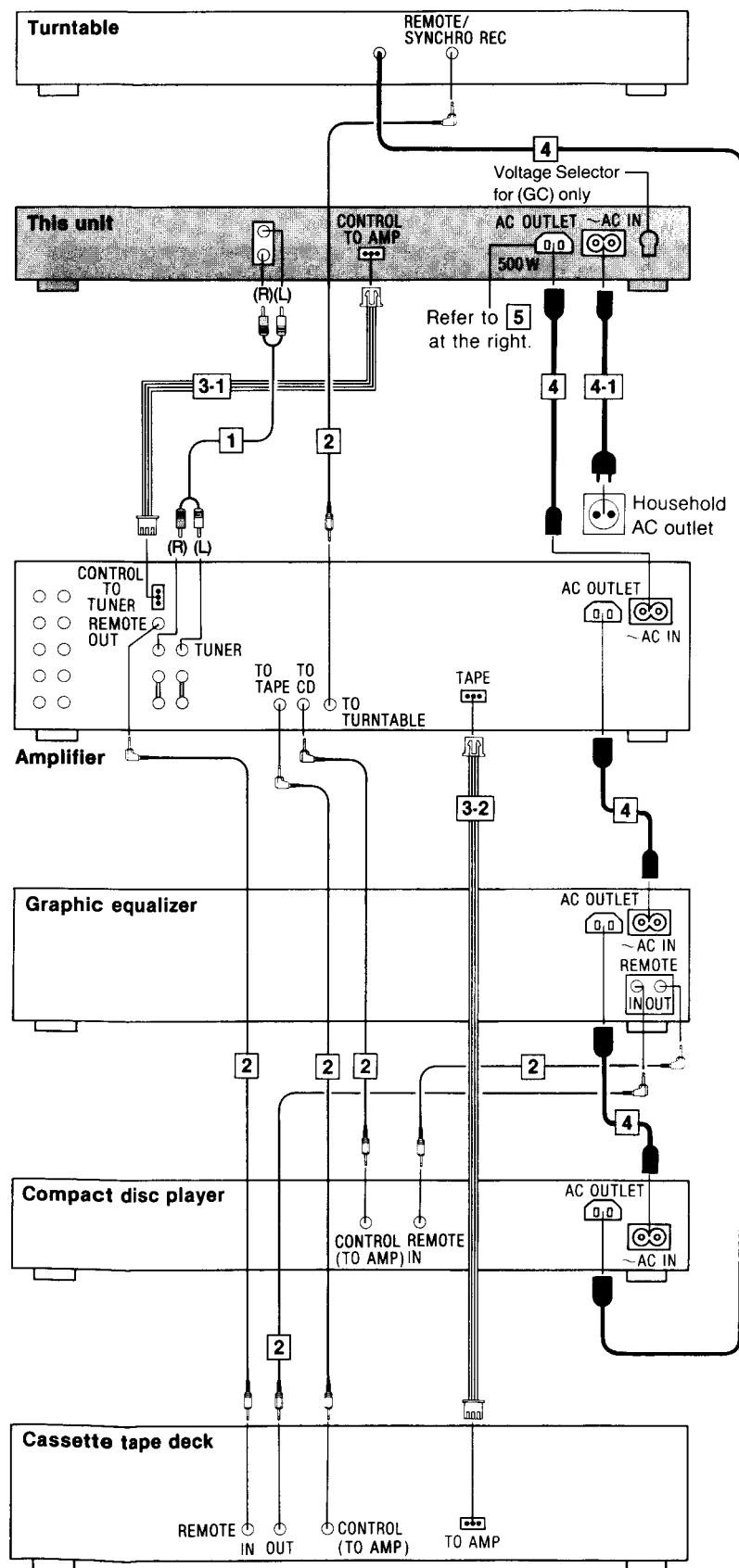
•REMOTE CONTROL TRANSMITTER



- A Easy play keys
- B Tuner keys
- C Turntable keys
- D Amplifier keys
- E Graphic equalizer controls
- F Compact disc player keys
- G Cassette tape deck keys

■ CONNECTIONS

Make connections in the numbered sequence by using the included cables and power cord.



Make connections as described below for remote-control operation and timer operation. For information concerning the stereo connection cables of each unit, refer to that unit.

1 Connect the stereo connection cable (included).

2 Connect the L-type cables.

3 Connect the 3-core flat cables.

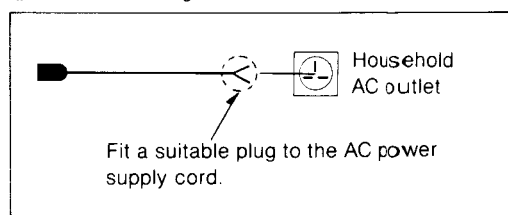
3-1 Connect the 3-core flat cable (included).

3-2 Connect the 3-core flat cable (included with the cassette deck).

4 Connect the AC power supply cords.

4-1 Connect the AC power supply cord (included).

1. Connect this cord only after all other cables have been connected.
2. For United Kingdom



Notes:

- Configuration of the AC outlets and AC power supply cords differ according to area.
- If the graphic equalizer is not used in combination with these components, connect the AC power supply cord of the compact disc player to the AC outlet of the amplifier.

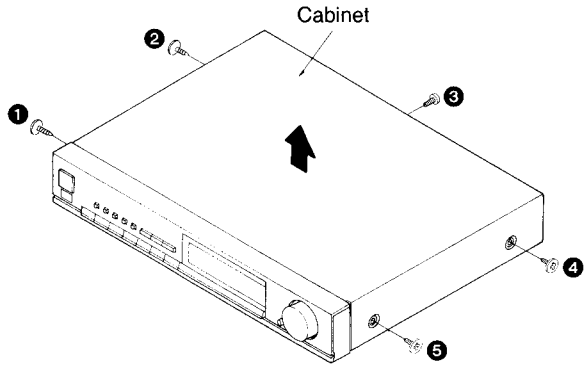
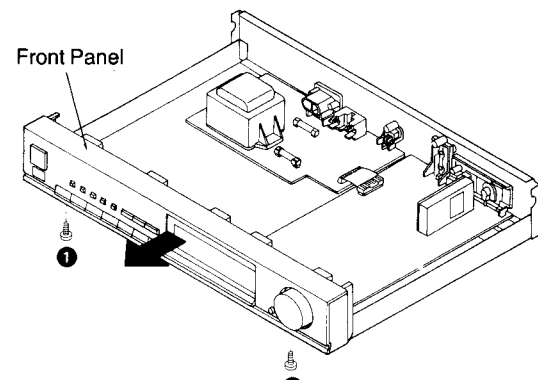
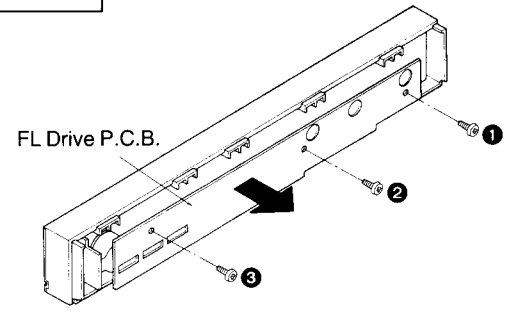
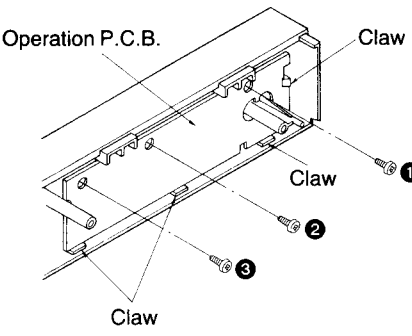
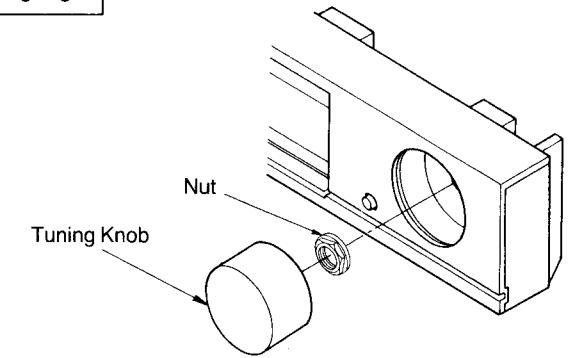
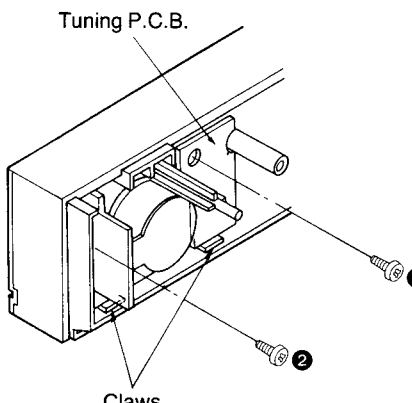
5 "AC OUTLET"
"SWITCHED" outlet

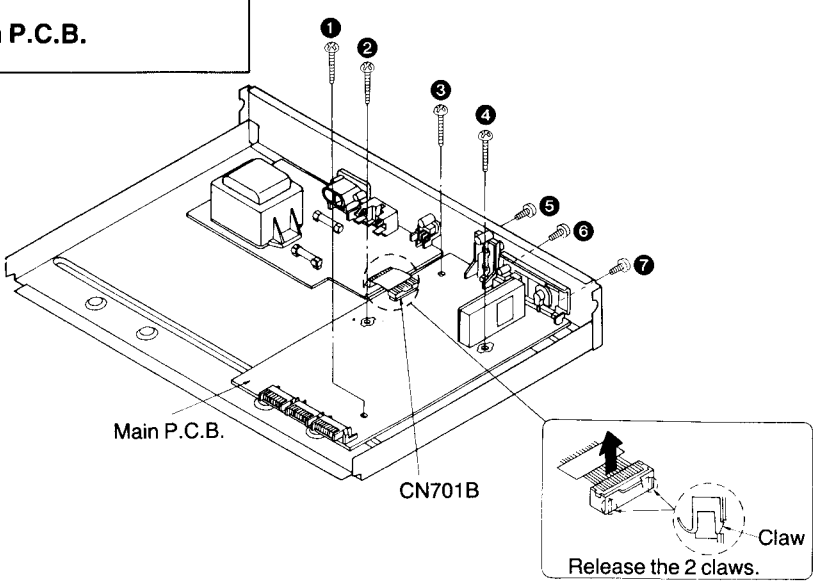
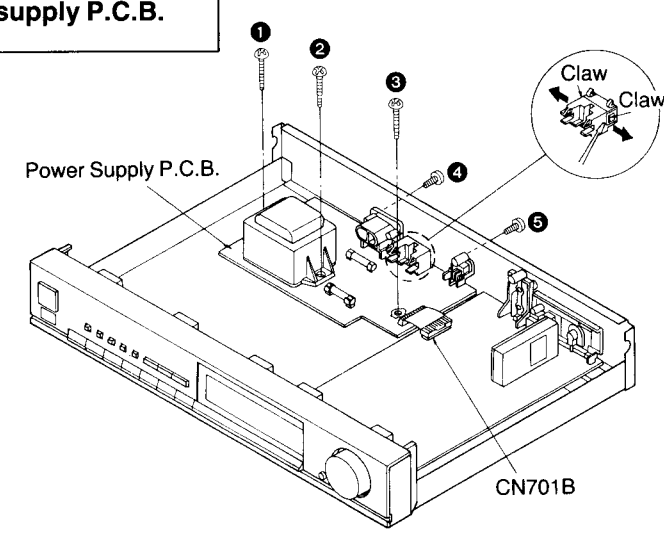
Power is controlled by the power switch.
This outlet is only for use with other audio equipment.

Note:

If another unit is connected to the AC outlet of this unit, be sure to check that the total amount of power consumption of each unit to be connected does not exceed the maximum power output allowed for the AC outlet of this unit.

■ DISASSEMBLY INSTRUCTIONS

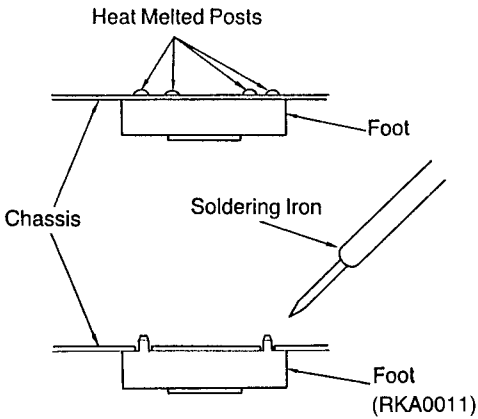
Ref. No. 1	Removal of the cabinet	Ref. No. 2	Removal of the front panel
Procedure 1	 ● Remove the 5 screws (1~5).	Procedure 1→2	 1. Remove the 2 screws (1, 2). 2. Remove the front panel in the direction of the arrow.
Ref. No. 3	Removal of the FL drive P.C.B.	Ref. No. 4	Removal of the operation P.C.B.
Procedure 1→2→3	 1. Remove the 3 screws (1~3).	Procedure 1→2→3→4	 1. Remove the 3 screws (1~3). 2. Release the 4 claws.
Ref. No. 5	Removal of the tuning P.C.B.		
Procedure 1→2→3→5	 1. Pull out the tuning knob. 2. Remove the nut.		 3. Remove the 2 screws (1, 2). 4. Release the 2 claws.

Ref. No. 6	Removal of the main P.C.B.	 1. Remove the 7 screws (1~7). 2. Remove the connection (CN701B).
Procedure 1→2→6		
Ref. No. 7	Removal of the power supply P.C.B.	 1. Remove the 5 screws (1~5). 2. Remove the connector (CN701B). 3. Remove the 2 claws of AC outlet.
Procedure 1→7		

“ATTENTION SERVICER”
Some chassis components may have sharp edges. Be careful when disassembling and servicing.

● Replacement of the Foot.

1. Remove the 4 heat melted posts on the chassis with a pair of nippers or similar tool.
2. To replace the foot (RKA0011) on the chassis, melt the 4 posts with a soldering iron.



MEASUREMENTS AND ADJUSTMENTS

FM ADJUSTMENT

Control positions and equipment used

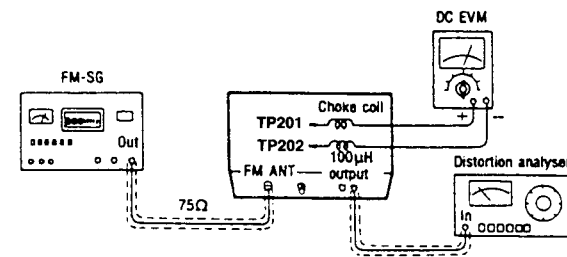
- FM signal generator(FM-SG)
- Stereo modulator
- Distortion analyser
- DC electronic voltmeter(EVM)
- Frequency counter
- Choke coil(100 μ H)
- Resistor(100k Ω)

Note: For Z251 (AM-ANT/OSC) and Z202 (AM-IFT), they are supplied as adjusted parts. So, do not turn the cores of the parts. It is not necessary to adjust the AM circuit.

FM MONO DISTORTION ADJUSTMENT

1. Test equipment connection is shown in figure.
 2. Set the unit to "FM" mode.
 3. Set the radio frequency display and signal generator to 100.10MHz.
 4. Adjust the core of T201 so that the voltage measured in signal mode is 0mV(0 $\pm$ 20mV) in 300mV range.
 5. Adjust T202 so that the distortion factor of L-CH and R-CH is minimized.
 6. Repeat steps 4 and 5.
- Note:** The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION
 Modulation 100%
 Modulation frequency 1kHz
 Output level 66dB



MPX VCO ADJUSTMENT

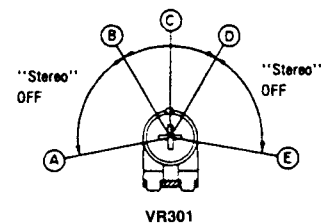
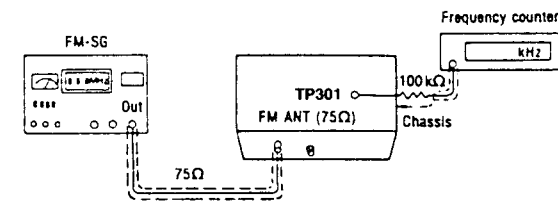
1. Test equipment connection is shown in figure.
2. Set the unit to "on/auto" position.
3. Set the radio frequency display and signal generator to 100.10MHz.
4. Adjust VR301 for 19kHz $\pm$ 30Hz on frequency counter reading.

USING ALTERNATE SYSTEM

1. Receive the stereo broadcast.
2. Adjust VR301 until stereo indicator lights up. Fix the arm of VR301 as shown in figure.

FM SIGNAL GENERATOR CONDITION

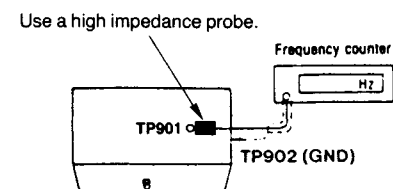
Modulation 100%
 Modulation frequency 0kHz
 Output level 66dB



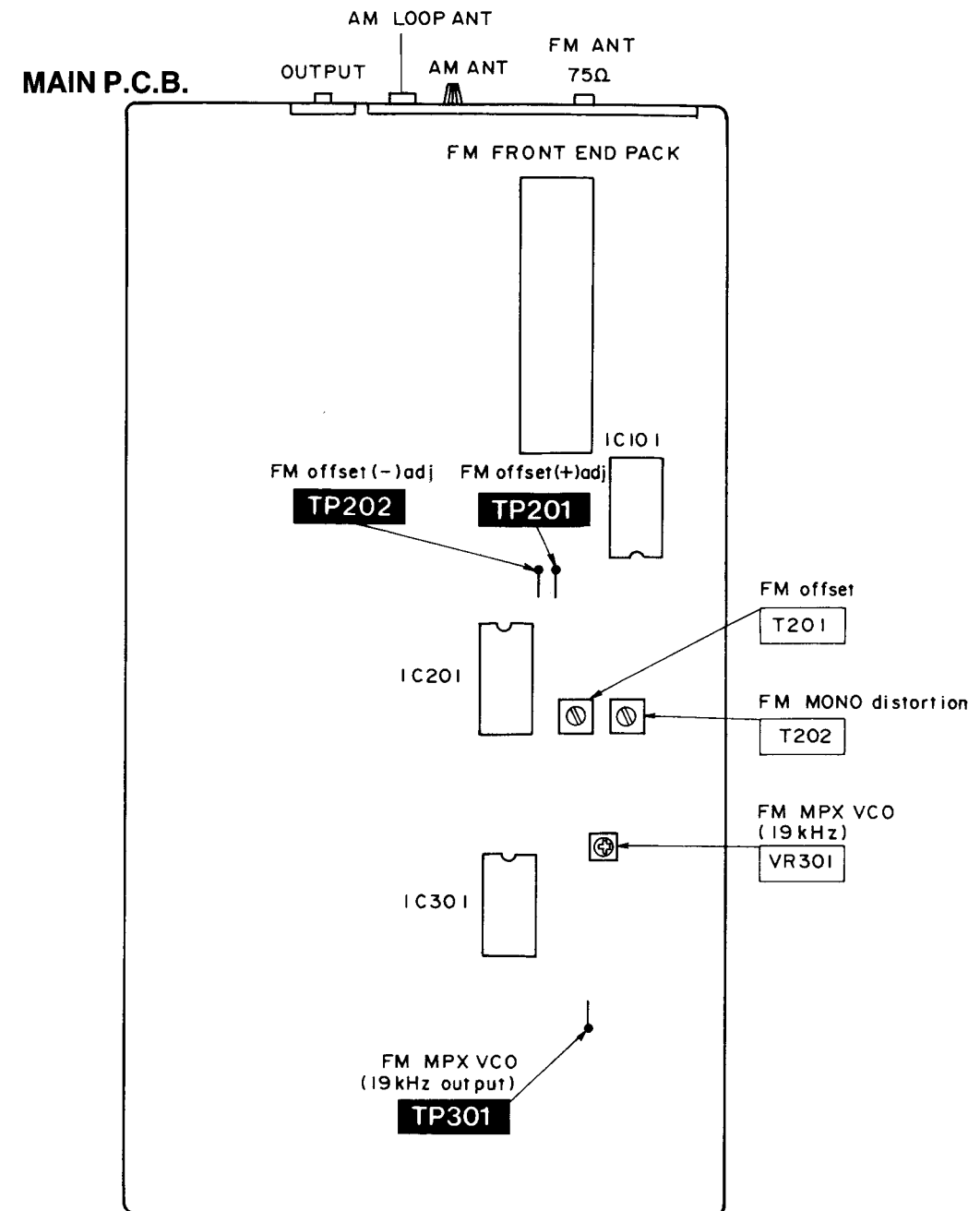
- ①-②..... "Stereo" OFF position
- ③-④..... "Stereo" ON position (Indicator lighting)
- ⑤..... Adjust point of pilot circuit

PLL CLOCK FREQUENCY ADJUSTMENT

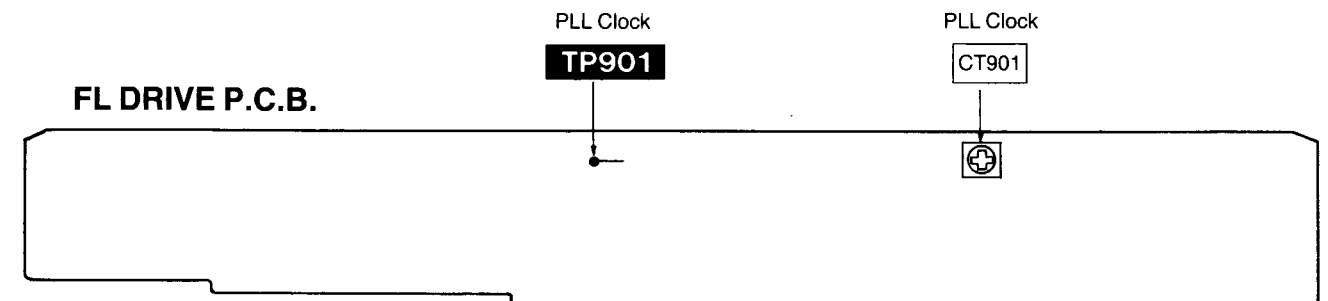
1. Test equipment connection is shown in figure.
2. Set the Power Switch to "OFF". (The indication "E" in the display will blink.)
3. Adjust CT901 for 2,097,152 Hz $\pm$ 10 Hz on frequency counter reading.



ADJUSTMENT POINT

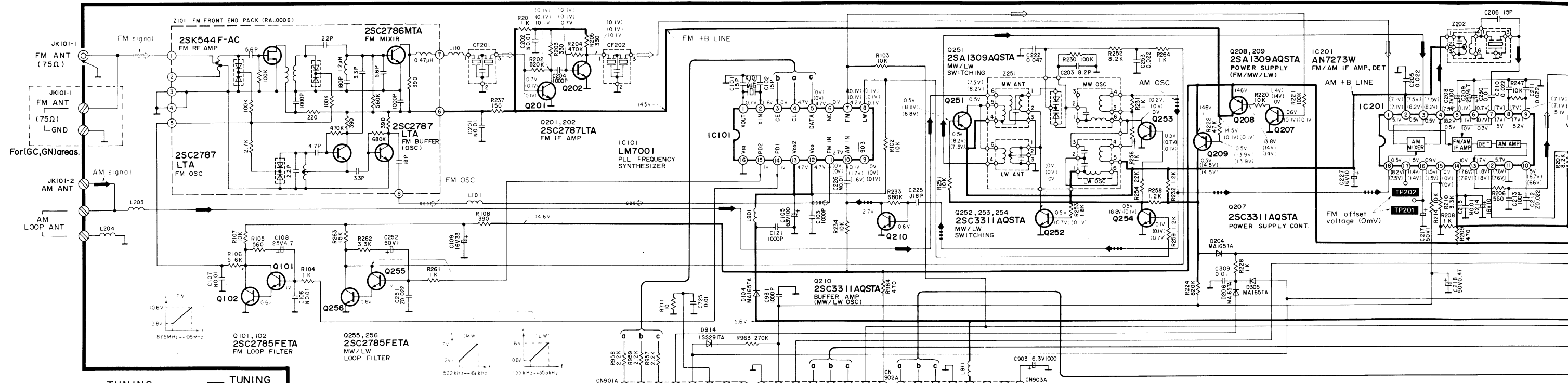


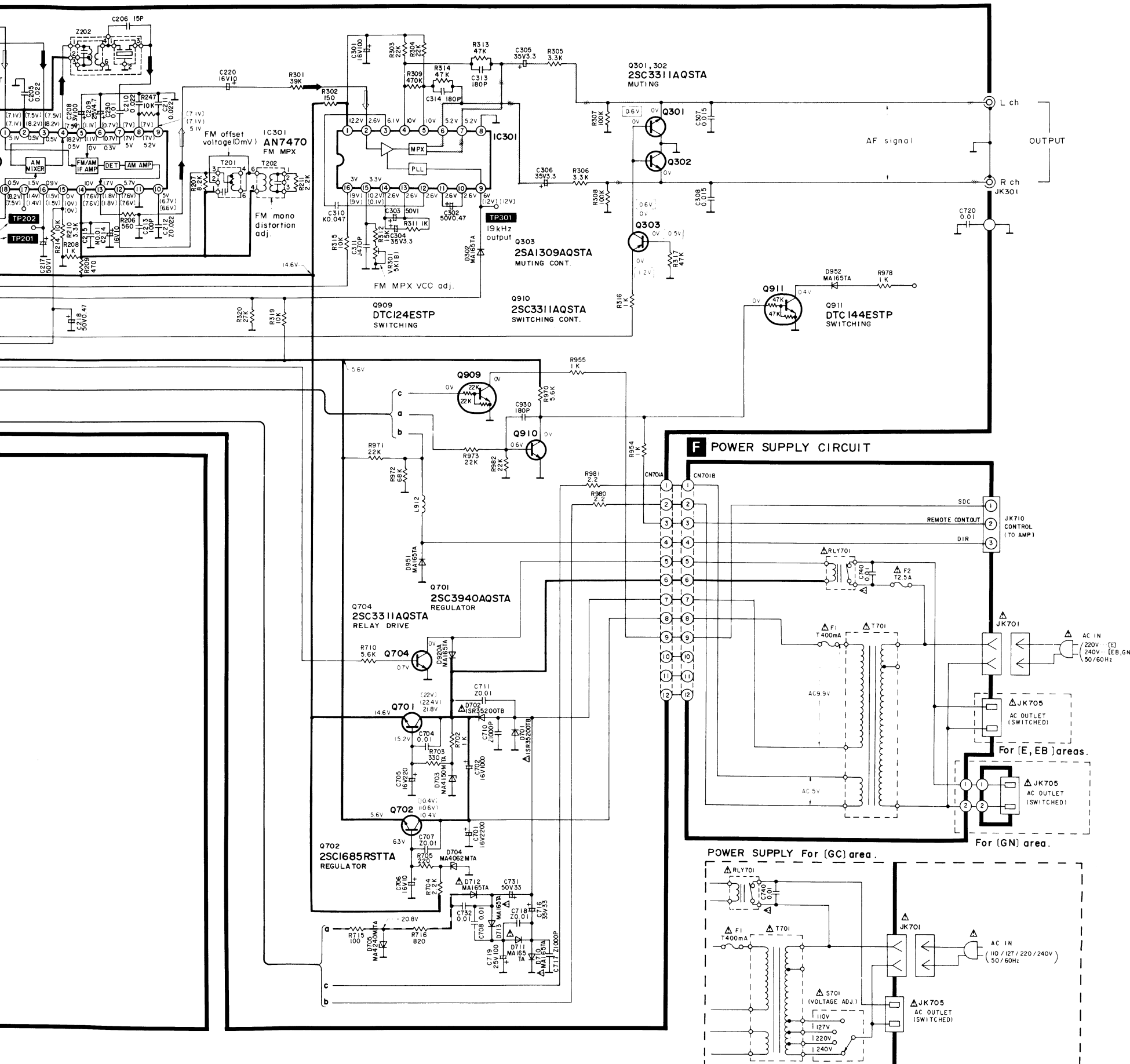
FL DRIVE P.C.B.



SCHEMATIC DIAGRAM (Parts list on pages 19~22.)

A MAIN CIRCUIT





(This schematic diagram may be modified at any time with the development of new technology.)

Notes:

- S701: Voltage select switch in "240 V" position. (110 V→127 V→220 V→240 V) for (GC) only
- S913: Band select (MW) switch.
- S914: Band select (LW) switch.
- S915: Memory switch.
- S916: Tuning mode select switch.
- S917: FM mode select switch.
- S918: Preset-channel (▲) switch.
- S919: Preset-channel (▼) switch.
- S920: Band select (FM) switch.
- S921: Power switch.
- S922: Sleep switch.
- S923: Cancel switch.
- S924: Stand-by switch.
- S925: Read switch.
- S926: Clock set switch.
- S927: Timer set switch.
- S928: Select (▼) switch.
- S929: Select (▲) switch.

•Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

•(): MW voltage []: LW voltage

□: muting voltage

— Positive voltage lines (+)
— Negative voltage lines (-)

AF signal lines

FM OSC

AM OSC

FM signal

AM signal

Important safety notice

Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Caution!

IC and LSI are sensitive to static electricity.

Secondary trouble can be prevented by taking care during repair.

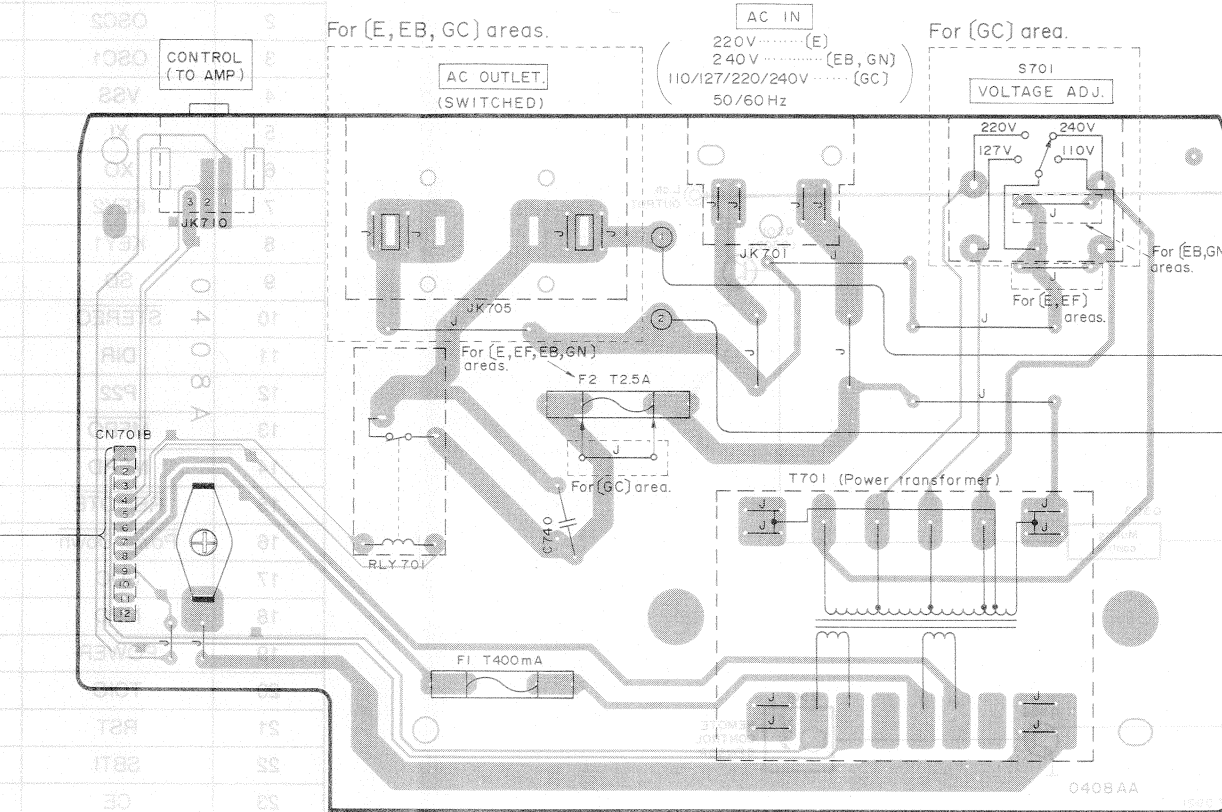
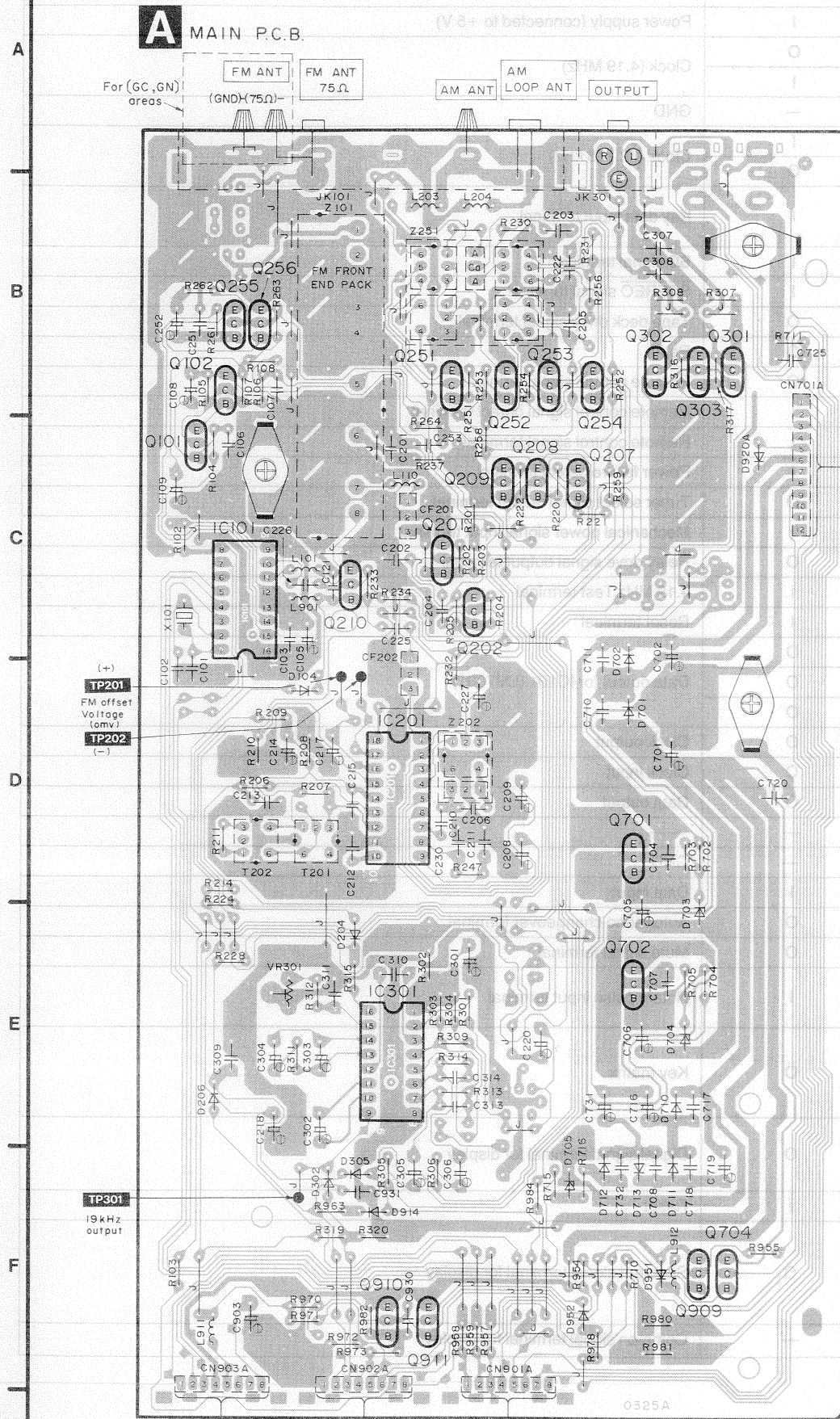
•Cover the parts boxes made of plastics with aluminum coil.

•Ground the soldering iron.

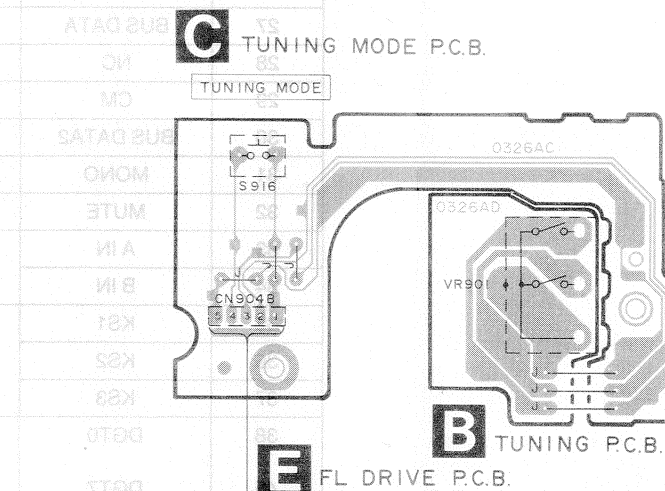
•Put a conductive mat on the work table.

•Do not touch the legs of IC or LSI with the fingers directly.

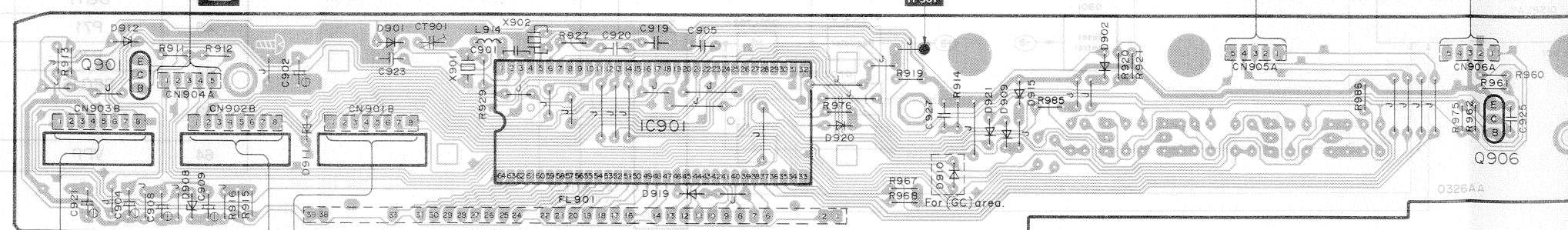
■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (Parts list on pages 19~22.)



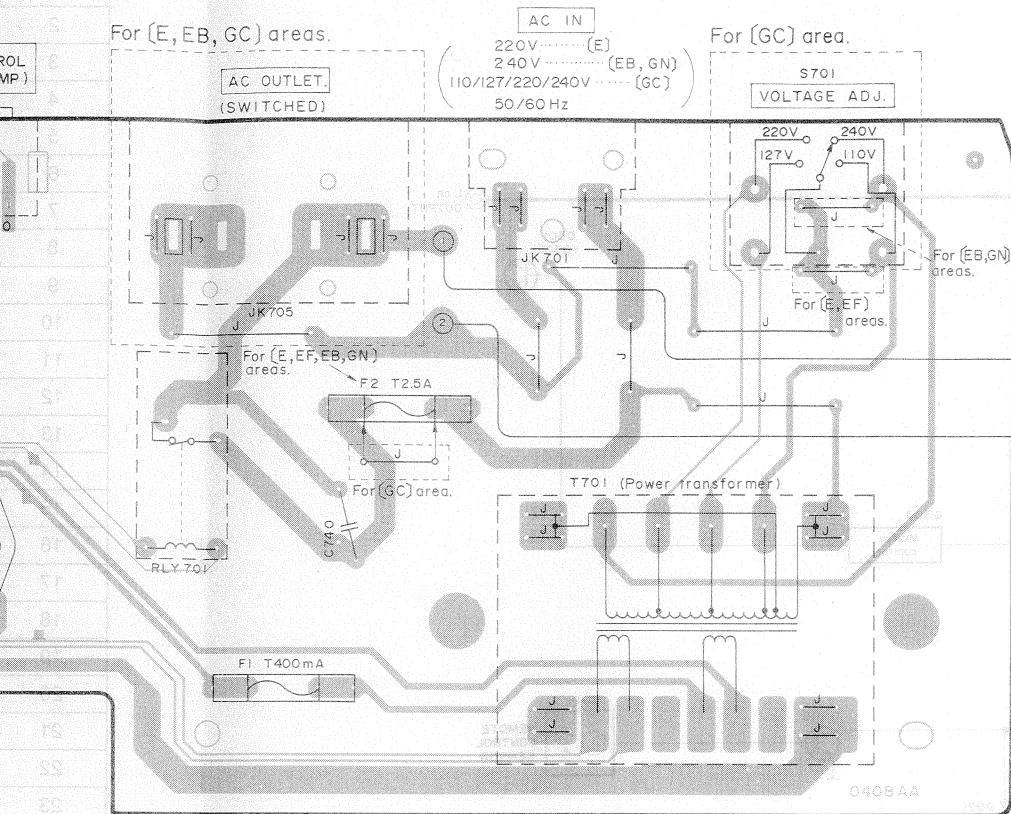
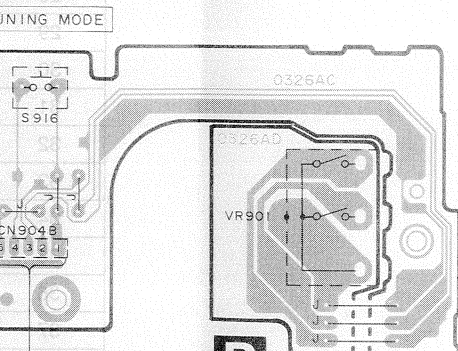
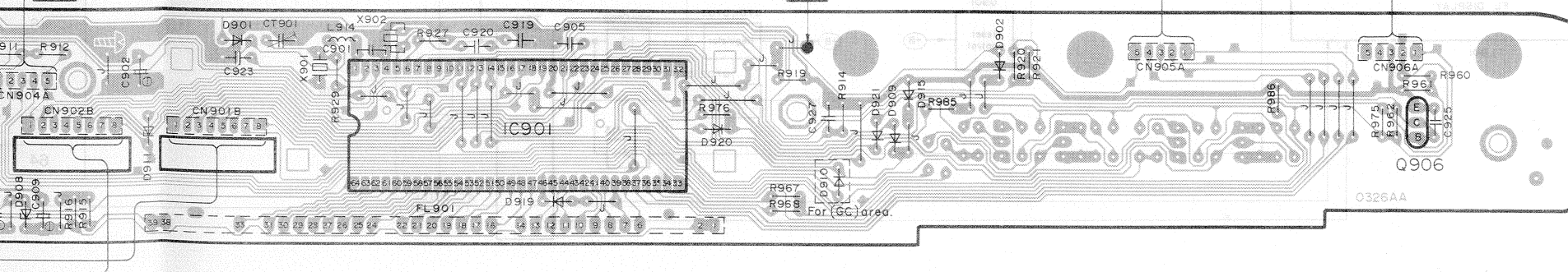
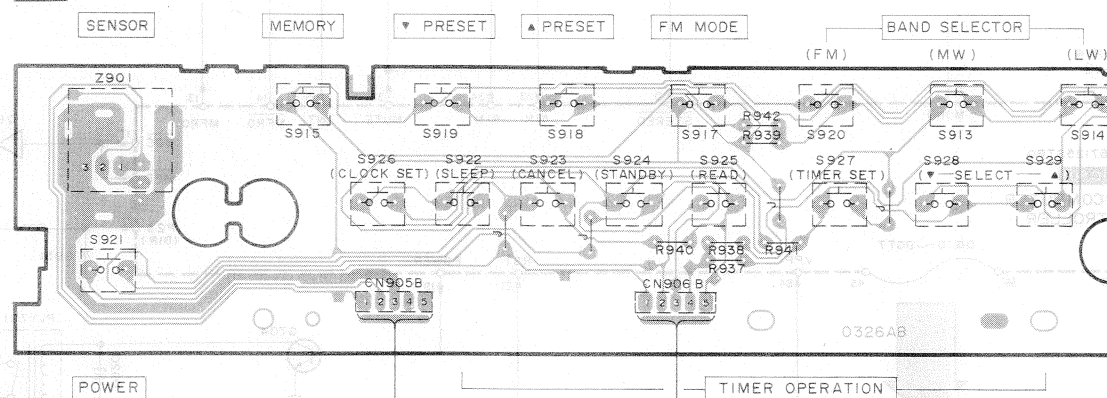
F POWER SUPPLY P.C.B.



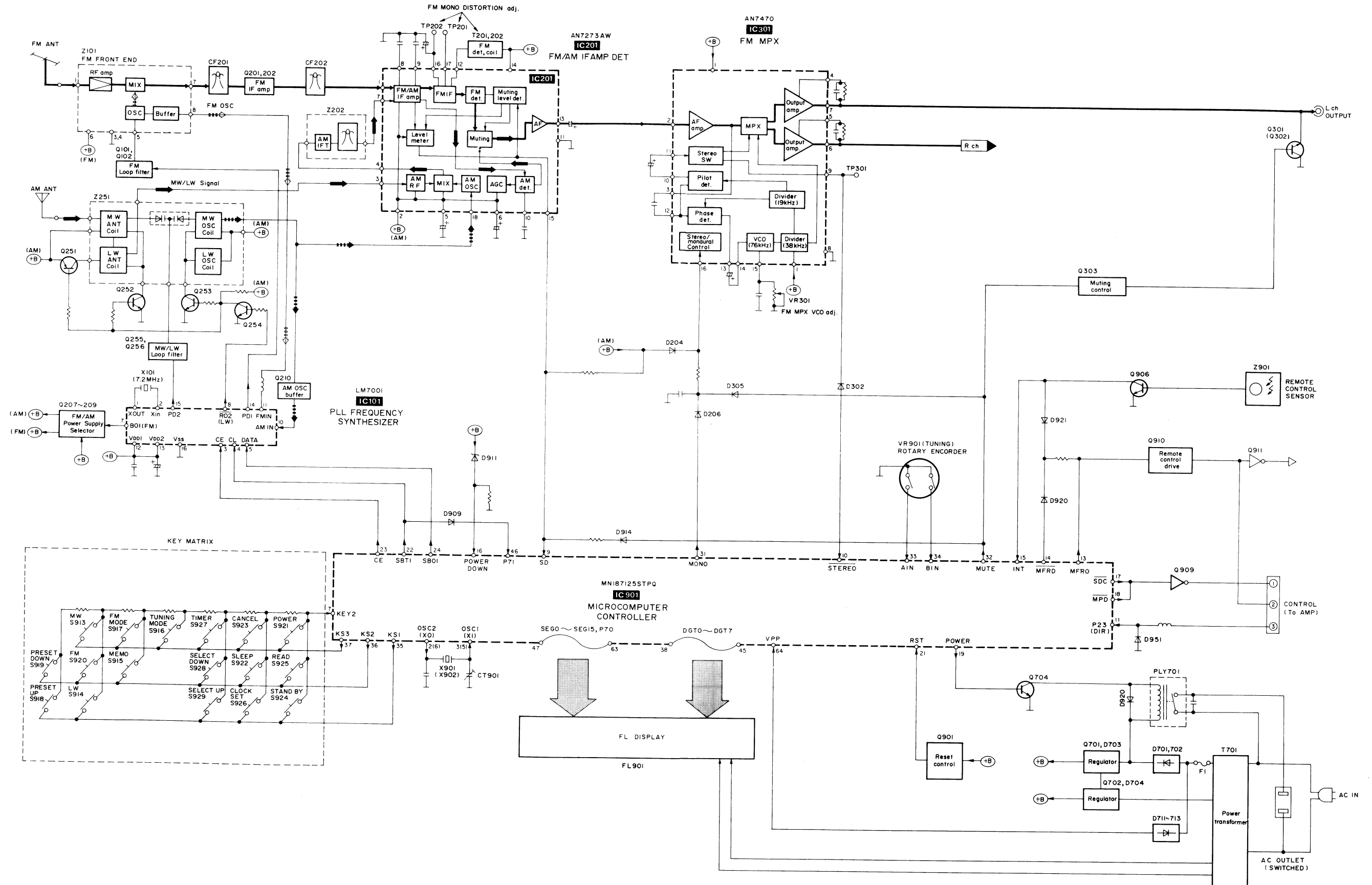
E FL DRIVE P.C.B.



Parts list on pages 19~22.)

**F** POWER SUPPLY P.C.B.**TUNING MODE P.C.B.****B** TUNING P.C.B.**E** FL DRIVE P.C.B.**D** OPERATION P.C.B.

BLOCK DIAGRAM



■ FUNCTIONS OF IC TERMINALS (IC901: MN187125STQ)

Pin No.	Mark	I/O Division	Function
1	VDD	I	Power supply (connected to +5 V)
2	OSC2	O	Clock (4.19 MHz)
3	OSC1	I	
4	VSS	—	GND
5	XI	I	Clock (32.768 kHz)
6	XO	O	
7	KEY2	I	Key data input terminal
8	KEY1		
9	SD	I	SD signal terminal
10	STEREO	I	STEREO signal terminal
11	DIR	O	Tape deck drive signal terminal
12	P22	O	Reset
13	MFR0	O	Remote control signal terminal
14	MFRD	I	Remote control signal detect terminal
15	REMOTE	I	Remote control signal terminal
16	Power Down	I	Power failure detect terminal
17	SDC	O	Tuner select signal output terminal
18	MPD	I	Mechanical power signal input terminal
19	POWER	O	Relay drive signal output terminal
20	TCIO	I	4.19 MHz Test terminal
21	RST	I	Reset terminal
22	SBTI	O	Data output for IC101 (LM7001)
23	CE	O	
24	SBOI	O	
25	BUS CK1	O	Clock output
26	BUS CK2	O	Clock input
27	BUS DATA	O	Data output
28	NC	—	—
29	CM	—	GND
30	BUS DATA2	I	Data input
31	MONO	O	Auto/mono changeover terminal
32	MUTE	O	Mute signal terminal
33	A IN	I	Rotary pulse input terminal
34	B IN		
35	KS1	O	Key matrix
36	KS2		
37	KS3		
38	DGT0	O	Digital signal terminal for display
45	DGT7		
46	P71	I	Reset
47	P70	O	Segment signal terminal for display
63	SEG15		
63	SEG0		
64	VPP	—	Common signal terminal for display

■ REPLACEMENT PARTS LIST

Notes : * Important safety notice:

Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

* The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.) Parts without these indications can be used for all areas.

* Remote Control Ass'y:

Supply period for three years from termination of production.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)		D911	MA4100MTA	DIODE	
				D912	MA165TA	DIODE	
				D914	1SS291TA	DIODE	
IC101	LM7001	I. C, PLL		D915	MA165TA	DIODE	
IC201	AN7273W	I., FM/AM IF AMP, DET		D919	MA165TA	DIODE	
IC301	AN7470	I. C, FM MPX		D920	MA165TA	DIODE	
IC901	MN187125STQ	I. C, CONTROLLER		D920A	MA165TA	DIODE	
		TRANSISTOR(S)		D921	MA165TA	DIODE	
				D951, 952	MA165TA	DIODE	
						VARIABLE RESISTOR(S)	
Q101, 102	2SC2785FETA	TRANSISTOR					
Q201, 202	2SC2787LTA	TRANSISTOR		VR301	EVNDXAA00B53	V. R, FM MPX VCO ADJ.	
Q207	2SC3311AQSTA	TRANSISTOR		VR901	EVQW902612B	V. R, ROTARY ENCODER	
Q208, 209	2SA1309AQSTA	TRANSISTOR				COMPONENT COMBINATION(S)	
Q210	2SC3311AQSTA	TRANSISTOR					
Q251	2SA1309AQSTA	TRANSISTOR					
Q252-254	2SC3311AQSTA	TRANSISTOR		Z101	RL0006	COMPONENT COMBINATION	
Q255, 256	2SC2785FETA	TRANSISTOR		Z202	RL12Z003M-T	COMPONENT COMBINATION	
Q301, 302	2SC3311AQSTA	TRANSISTOR		Z251	RLA6Z001-T	COMPONENT COMBINATION	
Q303	2SA1309AQSTA	TRANSISTOR		Z901	RCD0001-1	COMPONENT COMBINATION	
Q701	2SC3940AQSTA	TRANSISTOR				COIL(S)	
Q702	2SC1685RSTTA	TRANSISTOR					
Q704	2SC3311AQSTA	TRANSISTOR		L101	RLQZP1R0KT-Y	COIL	
Q901	2SC3311AQSTA	TRANSISTOR		L110	RLQZPR22KT-Y	COIL	
Q906	2SC3311AQSTA	TRANSISTOR		L203, 204	ELEPKR22MA	COIL	
Q909	DTC124ESTP	TRANSISTOR		L901	RLQZP101KT-Y	COIL	
Q910	2SC3311AQSTA	TRANSISTOR		L911, 912	RLQZP1R0KT-Y	COIL	
Q911	DTC144ESTP	TRANSISTOR		L914	ELEXT101KA9	COIL	
		DIODE(S)				TRANSFORMER(S)	
D104	MA165TA	DIODE		T201	RL14B002-Z	TRANSFORMER	
D204	MA165TA	DIODE		T202	RL14B003-Z	TRANSFORMER	
D206	MA165TA	DIODE		T701	RTP1K4E011	POWER TRANSFORMER	Δ (E) (EB) (GN)
D302	MA165TA	DIODE		T701	RTP1K4E012	POWER TRANSFORMER	Δ (GC)
D305	MA165TA	DIODE				FILTER(S)	
D701, 702	1SR35200TB	DIODE					
D703	MA4150MTA	DIODE		CF201, 202	RLFFETWNA01L	CERAMIC FILTER	
D704	MA4062MTA	DIODE				OSCILLATOR(S)	
D705	MA4240MTA	DIODE					
D710-713	MA165TA	DIODE	Δ	X101	SVQ49U722T-S	OSCILLATOR	
D901	1SS291TA	DIODE		X901	SVQ49U422T-S	OSCILLATOR	
D902	MA165TA	DIODE					
D908	MA4047MTA	DIODE					
D909	MA165TA	DIODE					
D910	MA165TA	DIODE	(GC)				

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
X902	RSXB32K7SD1	OSCILLATOR		JK705	RJS1A4602	AC OUTLET	△ (GN)
		DISPLAY TUBE		JK705	SJS9331B	AC OUTLET	△ (GC)
FL901	RSL0056-F	DISPLAY TUBE		JK710	RJS1A0203-0	CONTROL (TO AMP.)	
		SWITCH(ES)				FUSE(S)	
S701	SSR187-1	SW, VOLTAGE SELECTOR	△ (GC)	F1	XBA2C04TB0	FUSE 250V 0.4A	△
S913	EVQ21405R	SW		F2	XBA2C25TB0	FUSE 250V 2.5A	△ (E) (EB) (GN)
		CONNECTOR(S)					
CN901A	RJU003K008M1	SOCKET (8P)					
CN902A	RJU003K008M1	SOCKET (8P)					
CN903A	RJU003K008M1	SOCKET (8P)					
CN904A	SJT30548BB1	CONNECTOR (5P)					
CN905A	SJT30548BB1	CONNECTOR (5P)					
CN906A	SJT30548BB1	CONNECTOR (5P)					
CN701B	RJT005W012	CONNECTOR (12P)					
CN701A	RJU005W012	SOCKET (12P)					
CN901B	RJT003K008M1	CONNECTOR (8P)					
CN902B	RJT003K008M1	CONNECTOR (8P)					
CN903B	RJT003K008M1	CONNECTOR (8P)					
CN904B	SJS50581BB	SOCKET (5P)					
CN905B	SJS50581BB	SOCKET (5P)					
CN906B	SJS50581BB	SOCKET (5P)					
		VARIABLE CAPACITOR(S)					
CT901	ECRLB010A12	VARIABLE CAPACITOR					
		FUSE HOLDER(S)					
FC701	EYF52BC	FUSE HOLDER					
FC702	EYF52BC	FUSE HOLDER					
FC703	EYF52BC	FUSE HOLDER	(E) (EB) (GN)				
FC704	EYF52BC	FUSE HOLDER	(E) (EB) (GN)				
		RELAY(S)					
RLY701	RSY0003	RELAY	△				
		JACKS					
JK101	RJH4202	ANTENNA	(E) (EB)				
JK101	RJH4405-1	ANTENNA	(GC) (GN)				
JK301	SJF3068N	LINE OUT					
JK701	SJS9236	AC INLET	△ (E) (EB) (GC)				
JK701	SJSD16	AC INLET	△ (GN)				
JK705	RJS1A4902-B	AC OUTLET	△ (E)				
JK705	RJS1A4802-B	AC OUTLET	△ (EB)				

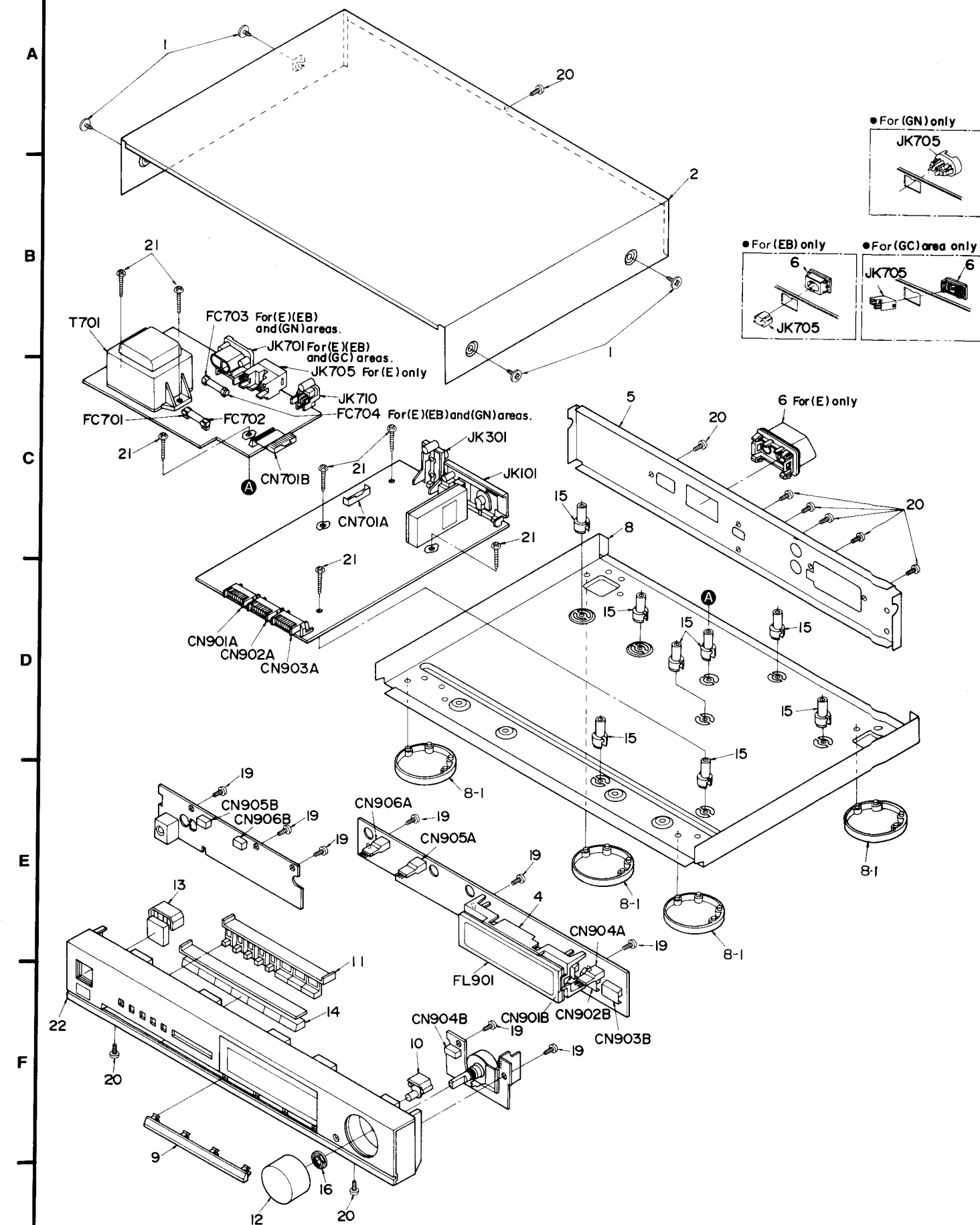
Notes : * Capacity value are in microfarads (uF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F)
* Resistance values are in ohms, unless specified otherwise, 1K=1,000 (OHM) , 1M=1,000k(OHM)

Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks
R102, 103	ERDS2TJ103T	1/4W 10K	R315	ERDS2TJ103T	1/4W 10K	C101, 102	ECBT1H150JC5	50V 15P
R104	ERDS2TJ102T	1/4W 1K	R316	ERDS2TJ102T	1/4W 1K	C103	ECBT1H102KB5	50V 1000P
R105	ERDS2TJ561T	1/4W 560	R317	ERDS2TJ473T	1/4W 47K	C105	ECEA0JU101B	6. 3V 100U
R106	ERDS2TJ562T	1/4W 5. 6K	R319	ERDS2TJ103T	1/4W 10K	C106, 107	ECBT1C103NS5	16V 0. 01U
R107	ERDS2TJ103T	1/4W 10K	R320	ERDS2TJ273T	1/4W 27K	C108	ECEA25M4R7RB	25V 4. 7U
R108	ERDS2TJ391T	1/4W 390	R702	ERDS2TJ102T	1/4W 1K	C109	ECEA1CU330B	16V 33U
R201	ERDS2TJ102T	1/4W 1K	R703	ERDS2TJ331T	1/4W 330	C121	ECBT1H102KB5	50V 1000P
R202	ERDS2TJ824T	1/4W 820K	R704	ERDS2TJ222T	1/4W 2. 2K	C201, 202	ECBT1C103NS5	16V 0. 01U
R203	ERDS2TJ331T	1/4W 330	R705	ERDS2TJ221T	1/4W 220	C203	ECBT1H8R2KC5	50V 8. 2P
R204	ERDS2TJ474T	1/4W 470K	R710	ERDS2TJ562T	1/4W 5. 6K	C204	ECBT1H102KB5	50V 1000P
R205	ERDS2TJ331T	1/4W 330	R711	ERDS2TJ100T	1/4W 10	C205	ECKR1H223ZF5	50V 0. 022U
R206	ERDS2TJ561T	1/4W 560	R715	ERDS2TJ101T	1/4W 100	C206	ECBT1H150JC5	50V 15P
R207	ERDS2TJ822T	1/4W 8. 2K	R716	ERDS2TJ821T	1/4W 820	C208	ECEA0JU101B	6. 3V 100U
R208	ERDS2TJ102T	1/4W 1K	R911	ERDS2TJ823T	1/4W 82K	C209	ECEA1EK4R7B	25V 4. 7U
R209	ERDS2TJ471T	1/4W 470	R912	ERDS2TJ183T	1/4W 18K	C210, 211	ECKR1H223ZF5	50V 0. 022U
R210	ERDS2TJ332T	1/4W 3. 3K	R913	ERDS2TJ224T	1/4W 220K	C212	ECBT1E223ZF5	25V 0. 022U
R211	ERDS2TJ222T	1/4W 2. 2K	R914	ERDS2TJ333T	1/4W 33K	C213	ECBT1H101KB5	50V 100P
R214	ERDS2TJ103T	1/4W 10K	R915, 916	ERDS2TJ101T	1/4W 100	C214	ECEA1CK100B	16V 10U
R220	ERDS2TJ103T	1/4W 10K	R919	ERDS2TJ103T	1/4W 10K	C215	ECBT1C103NS5	16V 0. 01U
R221	ERDS2TJ104T	1/4W 100K	R920	ERDS2TJ102T	1/4W 1K	C217	ECEA1HK010B	50V 1U
R222	ERDS2TJ473T	1/4W 47K	R921	ERDS2TJ103T	1/4W 10K	C218	ECEA1HKR47B	50V 0. 47U
R224	ERDS2TJ824T	1/4W 820K	R927	ERDS2TJ224T	1/4W 220K	C220	ECEA1CK100B	16V 10U
R228	ERDS2TJ102T	1/4W 1K	R929	ERDS2TJ152T	1/4W 1. 5K	C222	ECFR1E473KR	25V 0. 047U
R230	ERDS2TJ104T	1/4W 100K	R937	ERDS2TJ392T	1/4W 3. 9K	C225	ECBT1H180JC5	50V 18P
R231	ERDS2TJ102T	1/4W 1K	R938	ERDS2TJ562T	1/4W 5. 6K	C226	ECBT1C103NS5	16V 0. 01U
R232	ERDS2TJ122T	1/4W 1. 2K	R939	ERDS2TJ123T	1/4W 12K	C227	ECEA1CK100B	16V 10U
R233	ERDS2TJ684T	1/4W 680K	R940	ERDS2TJ182T	1/4W 1. 8K	C230	ECBT1C103NS5	16V 0. 01U
R234	ERDS2TJ103T	1/4W 10K	R941	ERDS2TJ222T	1/4W 2. 2K	C251	ECBT1E223ZF5	25V 0. 022U
R237	ERDS2TJ151T	1/4W 150	R942	ERDS2TJ273T	1/4W 27K	C252	ECEA1HK010B	50V 1U
R247	ERDS2TJ103T	1/4W 10K	R954, 955	ERDS2TJ102T	1/4W 1K	C253	ECBT1E223ZF5	25V 0. 022U
R251	ERDS2TJ103T	1/4W 10K	R957-959	ERDS2TJ222T	1/4W 2. 2K	C301	ECEA1CU101B	16V 100U
R252	ERDS2TJ822T	1/4W 8. 2K	R960, 961	ERDS2TJ104T	1/4W 100K	C302	ECEA1HKR47B	50V 0. 47U
R253	ERDS2TJ182T	1/4W 1. 8K	R962	ERDS2TJ682T	1/4W 6. 8K	C303	ECEA1HK010B	50V 1U
R254	ERDS2TJ223T	1/4W 22K	R963	ERDS2TJ274T	1/4W 270K	C304-306	ECEA1VK3R3B	35V 3. 3U
R256	ERDS2TJ102T	1/4W 1K	R967, 968	ERDS2TJ104T	1/4W 100K	C307, 308	ECFR1E153KR	25V 0. 015U
R258, 259	ERDS2TJ122T	1/4W 1. 2K	R970	ERDS2TJ562T	1/4W 5. 6K	C309	ECKR1H103ZF5	50V 0. 01U
R261	ERDS2TJ102T	1/4W 1K	R971	ERDS2TJ223T	1/4W 22K	C310	ECFR1E473KR	25V 0. 047U
R262	ERDS2TJ332T	1/4W 3. 3K	R972	ERDS2TJ683T	1/4W 68K	C311	ECQP1471JZ3	50V 470P
R263	ERDS2TJ153T	1/4W 15K	R973	ERDS2TJ223T	1/4W 22K	C313, 314	ECBT1H181KB5	50V 180P
R264	ERDS2TJ102T	1/4W 1K	R975	ERDS2TJ473T	1/4W 47K	C701	ECEA1CU222YB	16V 2200P
R301	ERDS2TJ393T	1/4W 39K	R976	ERDS2TJ103T	1/4W 10K	C702	ECEA1CU102B	16V 0. 01U
R302	ERDS2TJ151T	1/4W 150	R978	ERDS2TJ102T	1/4W 1K	C704	ECKR1H103ZF5	50V 0. 01U
R303, 304	ERDS2TJ223T	1/4W 22K	R980, 981	ERDS2TJ2R2T	1/4W 2. 2	C705	ECEA1CU221B	16V 220U
R305, 306	ERDS2TJ332T	1/4W 3. 3K	R982	ERDS2TJ223T	1/4W 22K	C706	ECEA1CK100B	16V 10U
R307, 308	ERDS2TJ104T	1/4W 100K	R984	ERDS2TJ471T	1/4W 470	C707, 708	ECKR1H103ZF5	50V 0. 01U
R309	ERDS2TJ474T	1/4W 470K	R985, 986	ERDS2TJ223T	1/4W 22K	C710	ECKR2H102ZF5	100V 1000P
R311	ERDS2TJ102T	1/4W 1K				C711	ECKR1H103ZF5	50V 0. 01U
R312	ERDS2TJ153T	1/4W 15K			CAPACITORS	C716	ECEA1W330B	35V 33U
R313, 314	ERDS2TJ473T	1/4W 47K				C717	ECKR2H102ZF5	100V 1000P

[illegible]

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
CABINET PARTS				ACCESSORIES			
1	RHD30007	SCREW		A1	RAK-SC301X	REMOTE CONTROLLER	
2	RKM0055-1K	CABINET		A1-1	RKM0008	BATTERY COVER, REMOTE CONT.	
4	RMN0076	FL HOLDER		A2	SQX7186	WARRANTY CARD	(GN)
5	RGR0086A-E	REAR PANEL	(E)	A2	RQA0013	WARRANTY CARD	(E) (EB)
5	RGR0086B-B	REAR PANEL	(EB)	A3	RQCB0169	SERVICE CENTER LIST	
5	RGR0086C-B	REAR PANEL	(GC)	A4	RFKSTX301LEK	INSTRUCTIONS MANUAL	(E)
5	RGR0086D-B	REAR PANEL	(GN)	A4	RQT0493-G	INSTRUCTIONS MANUAL	(GC)
6	RJS1A4902-A	AC OUTLET COVER	△ (E)	A4	RQT0492-B	INSTRUCTIONS MANUAL	(EB) (GN)
6	RJS1A4802-A	AC OUTLET COVER	△ (EB)	A5	SQX40014	AM INSTRUCTIONS	(GC)
6	SJS9331A	AC OUTLET COVER	△ (GC)	A5	SQX40022	AM INSTRUCTIONS	(GN)
8	RFKJTX901LEK	BOTTOM BOARD ASS'Y		A6	SJA193	POWER CORD	△ (EB)
8-1	RKA0011	FOOT		A6	RJA0004	POWER CORD	△ (GC)
9	RGM0253	ORNAMENT		A6	SJA173	POWER CORD	△ (GN)
10	RGU0381	BUTTON		A6	SFDAC05E03	POWER CORD	△ (E)
11	RGU0382	BUTTON		A7	SJPK2203-2	STEREO PIN CORD	
12	RGM0077	KNOB		A8	SPB1162T	AM LOOP ANTENNA	
13	SBC986-2	BUTTON		A8-1	SMA233-1M	HOLDER	
14	SBC987-2A	BUTTON		A8-2	SMA231M	HOLDER	
15	SHE187-2	HOLDER		A8-3	XTB3+10AFZ	SCREW	
16	SNE4021	NUT		A9	SSA272M	FM ANTENNA	(GC) (GN)
19	XTBS26+8J	SCREW		A9	SSA270M	FM ANTENNA	(E) (EB)
20	XTBS3+8JFZ1	SCREW		A10	SWKTX930E	LEAD WIRE	
21	XTB3+20JFZ	SCREW		A11	SJP9009	ATTACHMENT PLUG	△ (EB)
22	RFKGTX301LEK	FRONT PANEL ASS'Y		A12	SJP9215	AC PLUG ADAPTOR	△ (GC)
PACKING MATERIAL							
P1	RPG0455	PACKING CASE					
P2	RPN0329	PAD					
P3	SPSD152	ACCESSORIES BOX					
P4	XZB52X60A01Z	PROTECTION COVER					

EXPLODED VIEW



DEUTSCH

Tuner

ST-X301L

■ MESSUNGEN UND JUSTIERUNGEN

UKW JUSTIERUNGEN

Einstellungen der Bedienelemente und zu verwendende Geräte.

- UKW-Messender(UKW-MS)
- Stereo-Modulator
- Verzerrungs-Analysator
- Elektronische Gleichstrom-Voltmeter(EVM)
- Frequenzzähler
- Drosselspule(100µH)
- Widerstand(100kΩ)

Anmerkung: Für Z202 und Z251 werden bereits justierte Ersatzteile geliefert. Die Kerne dieser Teile daher nicht drehen.

UKW-MONO-VERZERRUNGS-JUSTIERUNG

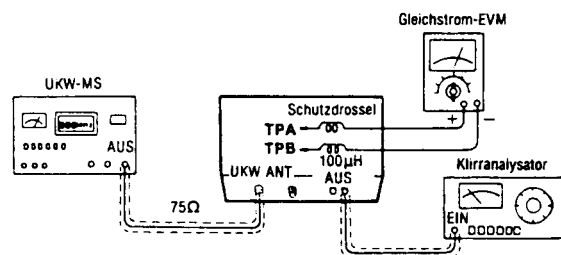
1. Der Testaufbau ist in der Abbildung gezeigt.
2. Stellen Sie die Einheit auf "FM(UKW)" Betrieb.
3. Die Radiofrequenzanzeige und den Messender auf 100.10MHz einstellen.
4. Den Kern von T201 so justieren, daß die im Signalzustand gemessene Spannung 0mV ($0 \pm 20\text{mV}$) im 300mV-Bereich beträgt.
5. T202 so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
6. Schritte 4 und 5 einige Male wiederholen.

Anmerkung:

Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

ZUSTAND DES UKW-MESSENDERS

Modulation 100%
Modulationsfrequenz 1kHz
Ausgangspegel 66dB



TPA = TP201, TPB = TP202

MPX-SGO-JUSTIERUNG

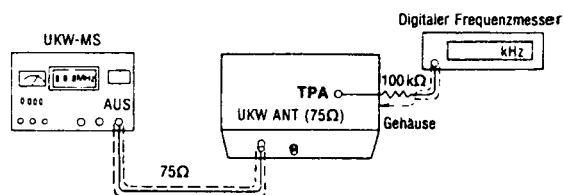
1. Der Testaufbau ist in der Abbildung gezeigt.
2. Den UKW-Betriebsart-Wahlschalter in die "on/auto"-Position stellen.
3. Radio und Meßsender auf 100.10MHz einstellen.
4. VR301 auf 19kHz $\pm$ 30Hz auf der Frequenzzähleranzeige justieren.

● VERWENDUNG EINES ALTERNATIVSYSTEMS

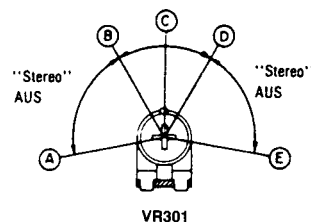
1. Stereosignal vom Meßsender eingeben oder eine Stereo-Sendung empfangen.
2. VR301 justieren, bis die Stereo-Anzeige aufleuchtet. Den Arm von VR301 mit Lack sichern, wie in der Abbildung gezeigt.

ZUSTAND DES UKW-MESSENDERS

Modulation 100%
Modulationsfrequenz 0kHz
Ausgangspegel.....66dB



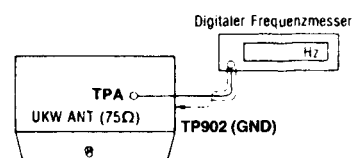
TPA = TP301



- A - B, D - E..... "Stereo" AUS Stellung
- B - D..... "Stereo" EIN Stellung (Anzeigebeleuchtung)
- C..... Einstellpunkt des pilotschaltkreis'

ELNSTELLUNG DER PHASENSPERRUNG EINES SCHLEIFENVERSCHLUSSES

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Die Netzschalter auf OFF stellen. (Die Anzeige "E" blinkt.)
3. CT901 auf $2,097,152\text{Hz} \pm 10\text{Hz}$ auf der Frequenzzähleranzeige justieren.



TPA = TP901

FRANÇAIS

■ MEURAGES ET REGLAGES

M.F. REGLAGES

Positionnements des commandes et équipement utilisé

- Générateur de signaux M.F. (FG-SG)
- Modulateur stéréophonique
- Analyseur de distorsion
- Voltmètre électronique à C.C. (EVM).
- Compteur de fréquence
- Bobine d'amortissement d'arrêt (100μH)
- Résistance (100KΩ)

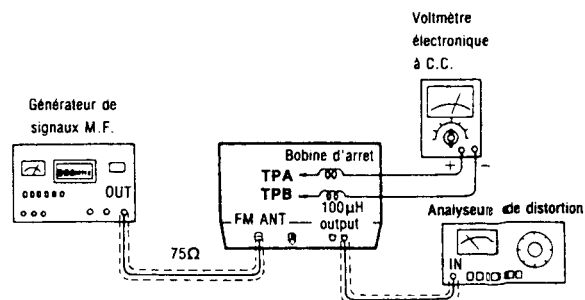
Nota: Pour Z202 et Z251, ajuster les éléments qui sont fournis. Aussi, ne pas tourner les noyaux de ces éléments.

REGLAGE DE DISTORSION MONOPHONIQUE M.F.

1. Le raccordement de l'équipement d'essai est montré sur l'illustration.
2. Régler l'appareil sur le mode "FM".
3. Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur **100.10MHz**.
4. Régler le noyau de **T201** de telle sorte que la tension mesurée sur le mode de signaux soit de **0mV (0mV ± 20mV)** dans une plage de 300mV.
5. Ajuster **T202** de telle que le facteur de distorsion du canal de gauche soit minimisé.
6. Répéter les étapes 4 et 5 quelques fois.

Nota: Le tournevis de réglage utilisé devra être fait en résines.

CONDITION DU GENERATEUR DE SIGNAUX M.F.
 Modulation 100%
 Fréquence de modulation 1kHz
 Niveau de sortie.....66dB



TPA = TP201 , TPB = TP202

REGLAGE MULTIPLEX DE L'OSCILLATEUR COMMANDE PAR VARIATION DE TENSION

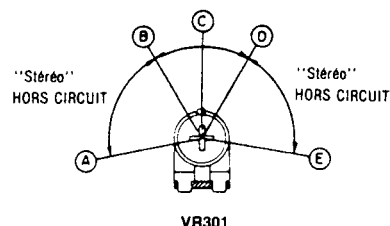
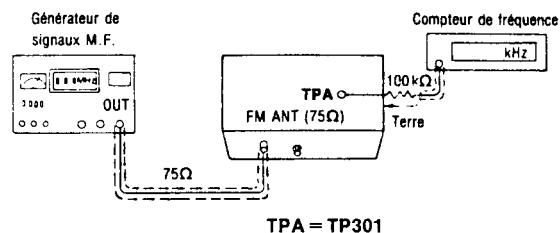
1. Le raccordement de l'équipement d'essai est montré sur la figure.
2. Régler l'appareil sur la position "on/auto".
3. Régler le cadran radio et le générateur de signaux sur 100.10MHz.
4. Ajuster VR301 pour 19kHz $\pm$ 30Hz sur le compteur de lecture de fréquences.

● EN UTILISANT UN SYSTEME ALTERNATIF

1. Applique un signal stéréo à partir du générateur ou recevoir une émission stéréo.
2. Ajuster VR301 jusqu'à ce que l'indicateur stéréo s'éclaire. Coller le bras de VR301 comme il est montré sur la figure.

CONDITION DU GENERATEUR DE SIGNAUX M.F.

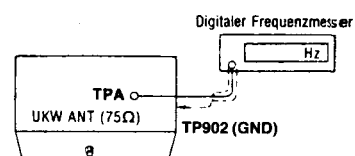
Modulation 100%
Fréquence de modulation 0kHz
Niveau de sortie.....66dB



- A—B, D—E..... Position de HORS CIRCUIT "Stereo".
B—D..... Position de MISE EN CIRCUIT "Stereo".
(Eclairage de l'indicateur)
C..... Point de réglage du circuit pilote.

REGLAGE DE L'HORLOGE EN BOUCLE À BLOCAGE DE PHASE

1. Le raccordement de l'équipement d'essai est montré sur la figure.
2. Placer l'interrupteur d'alimentation sur OFF. (L'indication "E" clignote sur l'affichage.)
3. Ajuster CT901 pour 2,097,152Hz $\pm$ 10Hz sur le compteur de lecture de fréquences.



TPA = TP901

ESPAÑOL

■ MEDICIONES Y AJUSTES

FM AJUSTES

Posiciones de control y equipo usado

- Generador de señales de FM(FM-SG)
- Modulador estereo
- Analizador de distorsiones
- Voltímetro electrónico de CC(EVM)
- Frecuencímetro
- Bobina de choque(100μH)
- Resistor(100kΩ)

Nota: Para Z202, Z251, L321 y L322, se suministran piezas ajustadas. Por lo tanto, no cambie los núcleos de estas piezas.

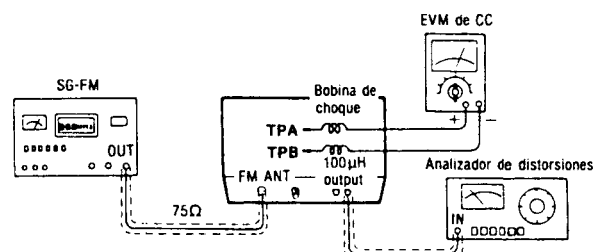
AJUSTE DE DISTORSION MONO FM

1. La conexión del equipo de pruebas se muestra en la figura.
2. Poner la unidad en modalidad de "FM".
3. Poner la puesta de la presentación de radiofrecuencia y generador de señales a **100.10MHz**.
4. Ajustar el núcleo de **T201** de manera que el voltaje medido en modalidad de señal sea **0mV (0±20mV)**.
5. Ajustar **T202** de manera que el factor de distorsión de CH-I se minimice.
6. Repetir los pasos 4 y 5 algunas veces.
7. Asegurarse de que los factores de distorsión de CH-I y CH-D sean casi los mismos y los mínimos.

Nota:

El destornillador de ajuste usado debe estar hecho de resina.

CONDICION DE GENERADOR DE SEÑALES DE FM
 Modulación 100%
 Frecuencia de modulación 1kHz
 Nivel de salida 66dB



TPA = TP201, TPB = TP202

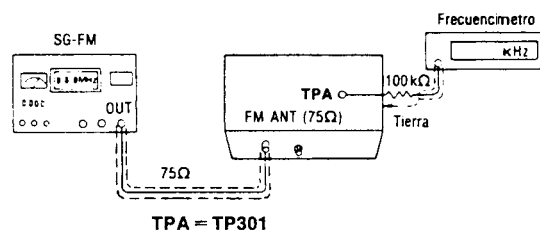
AJUSTE DE MPX VCO(OSCILADOR CONTROLADO POR VOLTAJE MPX)

1. La conexión del equipo de pruebas se muestra en la figura.
2. Poner la unidad en la posición de "on/auto".
3. Poner la presentación de la radio y la puesta del generador de señales en **100.10MHz**.
4. Ajustar **VR301** para **19kHz±30Hz** en lectura de frecuencímetro.

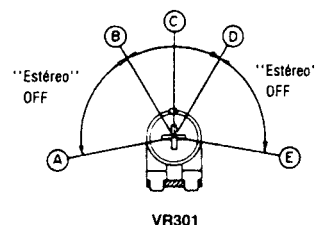
*** USANDO SISTEMA ALTERNATIVO**

1. Aplicar señal estereofónica del generador o recibir la emisión estereofónica.
2. Ajustar **VR301** hasta que la presentación de estéreo se encienda. Fijar el brazo de **VR301** como se muestra en la figura.

CONDICION DE GENERADOR DE SEÑALES DE FM
 Modulación 100%
 Frecuencia de modulación 0kHz
 Nivel de salida 66dB



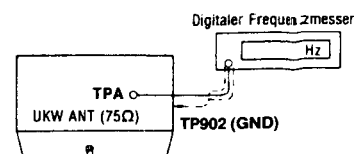
TPA = TP301



- (A) - (B),
 (D) - (E)..... Pósción de "estéreo" OFF.
 (B) - (D)..... Pósción de "estéreo" ON.
 (indicador encendido)
 (C)..... Punto de ajuste de circuito piloto.

AJUSTE DEL RELOJ DEL ENLACE DE LA FASE DE CIERRE(PHASE-LOCKED LOOP)

1. La conexión del equipo de pruebas se muestra en la figura.
2. Colocar el conmutador de alimentación en OFF (apagado). (La indicación "E" destellará.)
3. Ajustar **CT901** para **2,097,152Hz±10Hz** en lectura de frecuencímetro.



TPA = TP901